WILDLIFE ECOLOGY TEAM
WILDLIFE HABITAT RELATIONSHIPS
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Title:

Demographic characteristics of spotted owls in the Oregon Coast Ranges, 1990–2009.

Principal Investigator and Organizations:

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Study Objective:

The study objective was to elucidate the population ecology of the spotted owl in the Oregon Coast Ranges, to include age and sex specific birth and death rates, and population trend estimates.

Potential Benefit or Utility of the Study:

Information on the demography of spotted owl populations is used to estimate population trends and assess the effects of different management strategies on spotted owls. This study provides data that estimates survival, reproduction, and population parameters of spotted owls relative to landscape features in the Oregon Coast Ranges.

Research Accomplishments:

Study Area and Methods

The study area was located in the central Oregon Coast Ranges, principally on public forests administered by the Siuslaw National Forest and the Bureau of Land Management's Eugene and Salem Districts (Fig. 1). Municipal, state, and private timberlands were interspersed within these federal lands. We surveyed approximately 38% of

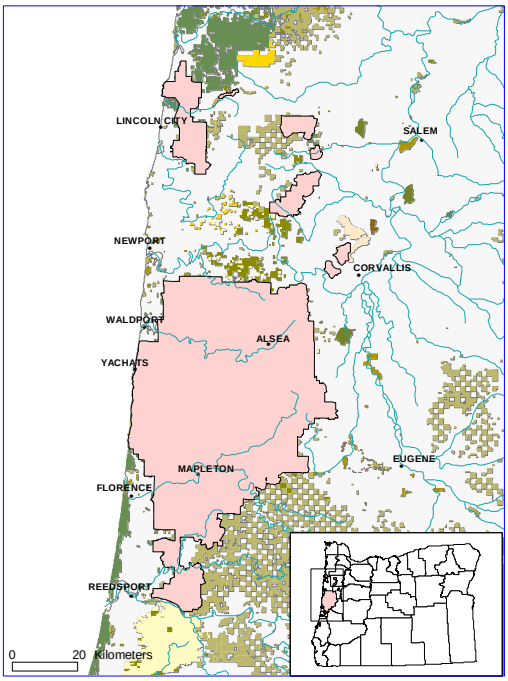

Figure 1. Oregon Coast Ranges spotted owl study area.

the 4,060 km^2 study area. In 2009, we surveyed 173 continuously-monitored spotted owl sites (demography sites) to determine occupancy, nesting status, and reproductive success. We and cooperating surveyors monitored 14 additional sites where spotted owls were initially detected while surveying adjacent demography sites or that were known from previous year's efforts. We used only the continuously-monitored sites to analyze population trends in recent demography analyses (Anthony et al. 2006; Forsman et al. *in review*). We used all sites that were part of the long-term monitoring effort to evaluate occupancy information in this report. Specifically, if we anticipated monitoring a site visited in the current year in the following year, we considered it part of this long-term monitoring effort. We used any territory where a female was detected and where reproductive status was determined to protocol (Lint et al. 1990) to evaluate reproductive information for this report. In 2009, due to logistic and workload considerations, we dropped sites from the long-term monitoring effort that did not contribute information to the recent population trend analyses. As a result of this decision and other changes in the number of sites monitored over time, counts of individuals detected and banded on an annual basis are not easily interpreted. Trends in proportion of sites occupied by spotted owls and proportion of sites where barred owls are detected are a better way of evaluating this type of information. We provide graphical representations of both interpretations of the data.

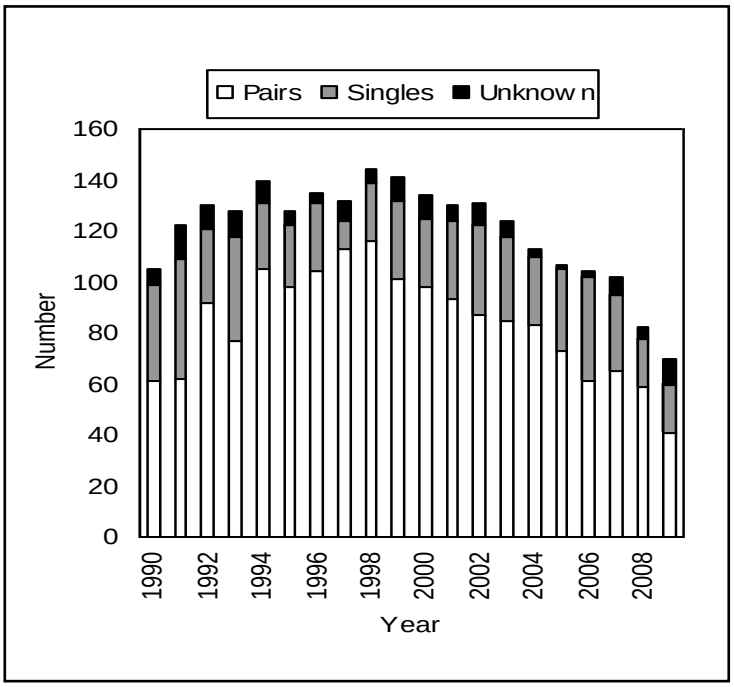

Figure 2. Number of sites occupied by spotted owl pairs, singles, or males and females of unknown status on the Oregon Coast Ranges Study Area, 1990–2009.

Number of Areas Where Owls Were Located

The effort to locate, band, and monitor owls consisted of a combination of surveys conducted by us and cooperators from the Bureau of Land Management, private consulting firms, and timber companies. From 1990–2009, we surveyed between 128 and 203 spotted owl sites. In 2009, we surveyed 173 sites and found 70 occupied territories, the lowest number since the initiation of the study (Fig. 2). We detected 124 non-juvenile spotted owls, also the lowest number since the start of the study. The number of sites that were occupied by pairs decreased sharply in 2009; this was partially explained by the reduction in number of sites surveyed (Appendix A). We detected 19 sites with single owls, and both male and female spotted owls were detected at 10 sites where pair status was not determined to protocol. The latter value is high relative to the number

recorded in recent years. We found 3 additional owls at sites where we also located another member of the same sex.

Proportion of Sites Occupied by Spotted Owls

The proportion of sites in which a spotted owl was detected has gradually declined over the course of the study from a high of 0.88 in 1991 to a low of 0.40 in 2008 and 2009 (Fig. 3, Appendix A). Although the overall proportion of occupied sites did not change in 2009, the proportion of the sites occupied by pairs in 2009 reached an all-time low of 0.24 (Fig. 3).

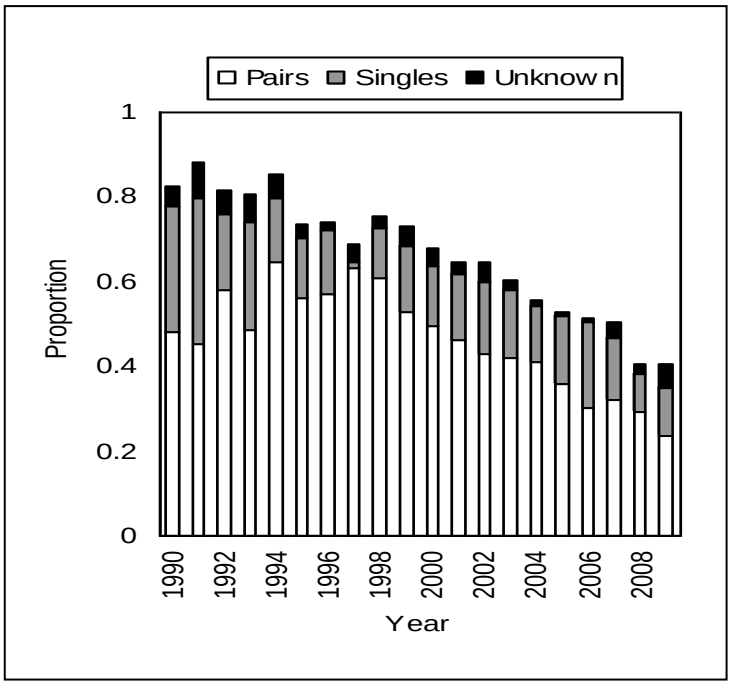

Figure 3. Proportion of sites occupied by spotted owl pairs, singles, or males and females of unknown status on the Oregon Coast Ranges Study Area, 1990–2009.

Number of Owls Marked

We banded 320 adult, 74 subadult, and 726 juvenile spotted owls on the study area in 1990–2009 (Appendix B). In 2009, we banded 7 spotted owls, including 5 males, 1 female, and 1 juvenile. We replaced color bands on 4 owls that were originally banded as juveniles, all of which were females. One adult female and one adult male were trapped because: the biologists thought the bird was unbanded, and the identity of the bird could not be determined, respectively. We trapped an additional 12 birds (6 unbanded juveniles; 1 unbanded male; 3 males and 1 female that were originally banded as juveniles; and 1 adult female that was trapped to remove a backpack transmitter) on sites adjacent to this or neighboring demographic study areas.

Movements, Emigration and Immigration

Of the 22 owls that were known to have moved between, on, or off demography sites, 14 were movements within the study area. Only 1 of these was initially banded as a juvenile. In addition, there were 5 cases of emigration and 3 cases of immigration. Four of these movements were associated with dispersing juveniles. In addition, we and our cooperators documented movements between non-demography sites for an additional 6 birds. Five of these birds were initially banded as juveniles.

Barred Owl Detections

The proportion of sites where at least one barred owl was detected within 1.6 km of the year-specific spotted owl activity center has increased steadily throughout the duration of the study, suggesting a steady increase in the barred owl population, while the proportion of sites occupied by spotted owls has declined (Fig. 4, Appendix A). Our survey methods probably underestimated the number of sites with barred owls because we did not specifically target barred owls by mimicking their calls, and we often did not survey at night when we found spotted owls during initial day surveys.

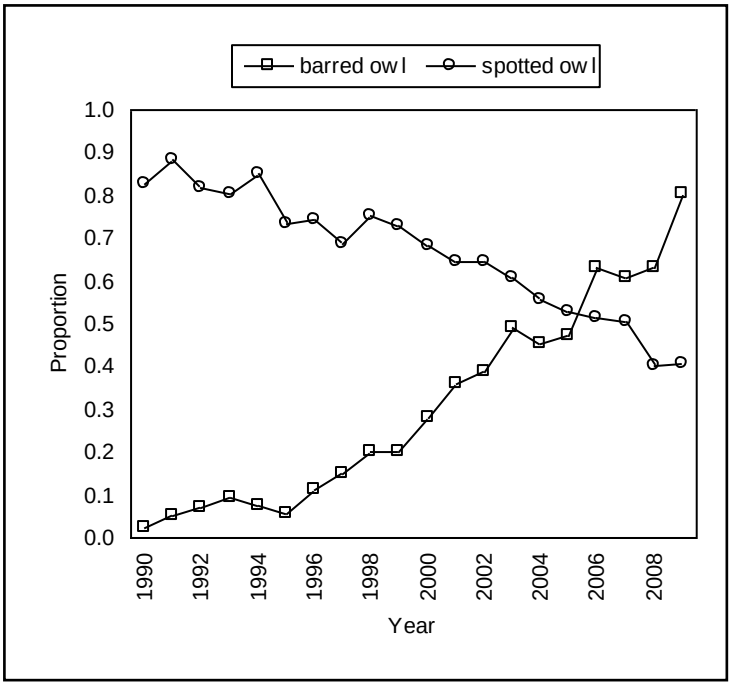

Figure 4. Proportion of spotted owl sites in which barred owls and spotted owls were detected on the Oregon Coast Ranges Study Area, 1990–2009.

The continued increase in the annual proportion of territories where barred owls were detected is likely due to an increase in barred owl numbers, as well as increased nighttime survey effort at sites where spotted owls have disappeared (Fig. 5). The proportion of total survey time that included surveys at night has doubled from 0.32 in 1990 to 0.64 in 2009 (Fig. 5).

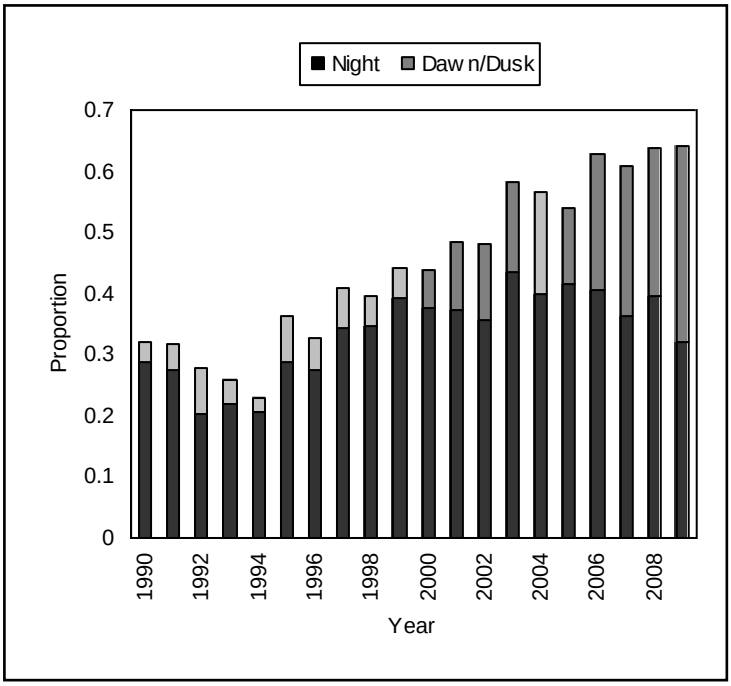

Figure 5. Proportion of survey effort conducted at night and dawn or dusk on the Oregon Coast Ranges Study Area, 1990–2009.

Sex Ratio

The number of males detected in 2009 was 1 more than the number of females (Appendix C). The mean difference in the proportions of known sex owls detected on the study area in 1990–2009 was 0.07 (*SE* = 0.01; annual range = 0.00–0.18), with more detections of males than females. We suspect that the disproportionate number of males detected is due to sexual differences in detectability rather than a real difference

in the population, but this has not been tested.

Reproduction

During the first decade of this study, reproductive and nesting estimates followed a cyclic biennial pattern with higher reproduction in even-numbered years (Appendices D–H). Starting in 2000, this pattern broke down (Fig. 6). The mean fecundity for the last half of the study was 6% lower than the mean for the first half of the study (Fig. 6).

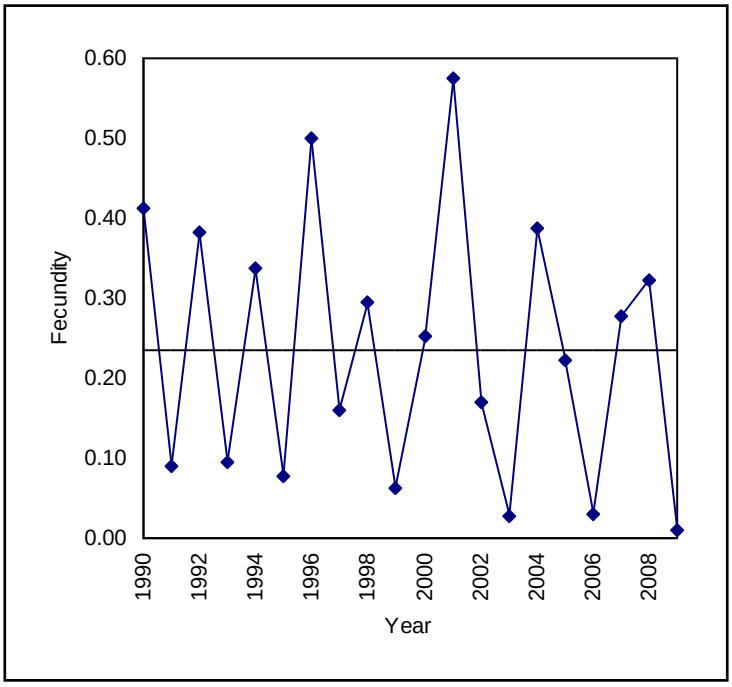

Figure 6. Estimated annual fecundity of female spotted owls on the Oregon Coast Ranges Study Area, 1990–2009. Horizontal line indicates the mean of yearly means (0.23 ± 0.04 *SE*).

All measurements of reproductive effort for 2009 were the lowest ever for the study area. Of the 2 females that nested in 2009, 1 successfully fledged 1 young (Appendix F). The proportion of females that attempted to nest was 0.02, dramatically lower than the overall value of 0.46 (Appendix D). The proportion of females that fledged young in 2009 (0.02) was also substantially lower than the overall value (0.31; Appendix E). Estimated annual fecundity for all non-juvenile females in 2009 was 0.01, well below the overall mean fecundity of 0.24 (Fig. 6, Appendix G).

Problems Encountered:

Road closures and a reduction in forest road maintenance have greatly restricted access and resulted in considerable increase in the number of areas that need to be accessed on foot or by bicycle. Diminished access has led to increased survey times.

Research Plans for FY 09:

a. Continue demographic study with field work in March 2010.

b. Continue to GPS historic spotted owl nest trees.

Publications and Technology Transfer Activities:

a. Participated in and assisted in organizing northern spotted owl meta-analysis workshop.

b. Conducted field trips with university students and professional organizations.

c. Provided demographic data to federal, state, and private organizations for their management activities.

d. Detailed summary information regarding survey results and territory status determinations were provided to the Siuslaw National Forest and the Bureau of Land Management's Eugene, Coos Bay, and Salem Districts.

e. Provided updates regarding the current occupancy and reproductive status of owl territories to the Oregon Department of Forestry.

Duration of Study:

a. Initiated in FY 1990.

b. Contingent upon future funding. Currently funded through FY 2010.

Literature Cited:

Anthony, R. G., E. D. Forsman, A. B. Franklin, D. R. Anderson, K. P. Burnham, G. C. White, C. J. Schwarz, J. Nichols, J. Hines, G. S. Olson, S. H. Ackers, S. Andrews, B. L. Biswell, P. C. Carlson, L. V. Diller, K. M. Dugger, K. E. Fehring, T. L. Fleming, R. P. Gerhardt, S. A. Gremel, R. J. Gutiérrez, P. Happe, D. R. Herter, J. M. Higley, R. B. Horn, L. L. Irwin, P. J. Loschl, J. A. Reid, and S. G. Sovern. 2006. Status and trends in demography of northern spotted owls. Wildlife Monographs 163:1–48.

Forsman, E. D., R. G. Anthony, K. M. Dugger, E. M. Glenn, A. B. Franklin, G. C. White, C. J. Schwarz, K. P. Burnham, D. R. Anderson, J. D. Nichols, J. E. Hines, J. B. Lint, R. J. Davis, S. H. Ackers, L. S. Andrews, B. L. Biswell, P. C. Carlson, L. V. Diller, S. A. Gremel, D. R. Herter, J. M. Higley, R. B. Horn, J. A. Reid, J. Rockweit, J. Schaberel, T. J. Snetsinger, and S. G. Sovern. *In review*. Population demography of northern spotted owls: 1985–2008. Studies in Avian Biology.

Lint, J., B. Noon, R. Anthony, E. Forsman, M. Raphael, M. Collopy, and E. Starkey. 1990. Northern spotted owl effectiveness monitoring plan for the Northwest Forest Plan. General Technical Report PNW-GTR-440. USDA Forest Service, Pacific Northwest Research Station, Portland, OR.

Appendix A. Historic spotted owl sites surveyed per year and the number of these with spotted owl pairs, spotted owl singles, unknown status spotted owls, hybrid owls, mixed species pairs, and barred owls in the Oregon Coast Ranges Study Area, 1990–2009.

Year	Surveyed	Pairs[1]	Singles[2]	Unknown status[3]	Additional owls[4]	Additional owl sites	Hybrid owls[5]	Mixed spp. pairs[6]	Barred owls[7]
1990	127	61	38	6	4	4	0	0	3
1991	137	62	47	12	4	3	0	0	7
1992	159	92	29	9	4	4	0	0	11
1993	159	77	41	10	1	1	0	0	15
1994	163	105	25	9	5	5	0	1	12
1995	174	98	24	6	2	2	0	0	10
1996	182	104	27	4	0	0	0	2	20
1997	179	113	11	7	3	2	0	1	27
1998	191	116	23	5	4	4	1	1	38
1999	192	101	30	9	5	5	1	1	40
2000	197	98	27	9	7	7	1	1	55
2001	201	93	31	6	3	3	0	0	72
2002	203	87	35	9	4	4	0	0	79
2003	203	85	33	5	8	7	1	0	100
2004	203	83	27	3	10	8	2	2	92
2005	203	73	32	2	3	3	1	1	96
2006	203	61	41	2	2	2	2	1	128
2007	203	65	30	7	7	6	0	0	123
2008	203	59	19	4	1	1	1	1	128
2009	173	41	19	10	3	3	2	1	126

[1]Sites occupied by a spotted owl pair. Spotted owls paired with barred owls or hybrid owls are categorized as singles (9 cases over all years).

[2]Sites were occupied by at least a single spotted owl. If more than a single spotted owl was detected but the birds were of the same sex, it was classified as a single territory.

[3]Unknown status sites had detections of both a male and a female spotted owl, but the birds did not meet pair status.

[4]Additional owls were cases in which more than a single spotted owl of the same sex was detected.

[5]Hybrid owls were considered present if they were detected within the site boundary. Cases include: single hybrid owls (1), hybrid males at a territory occupied by a spotted owl (2), spotted owls paired with hybrid owls (4), hybrid owls paired with barred owls (4); a hybrid male paired with a barred owl at a territory occupied by a spotted owl (1).

[6]Mixed species pairs included territories in which at least one of the birds had some spotted owl ancestry and it was not a straight-forward spotted owl pair (e.g., spotted owl–hybrid owl, hybrid–barred owl, barred owl–spotted owl, etc.), but pair status was established to protocol (13 cases over all years).

[7]Barred owls were considered present if one was detected within 1.6 km of the most recent preceding spotted owl annual activity center.

Appendix B. Number of spotted owls banded on historic sites in the Oregon Coast Ranges Study Area, 1990–2009.

Year	Adult		Subadult		Juveniles
	Males	Females	Males	Females	
1990	42	30	7	3	31
1991	25	23	2	4	7
1992	27	30	4	4	60
1993	6	8	2	0	13
1994	16	18	3	1	62
1995	5	8	1	2	13
1996	7	1	4	4	101
1997	3	7	4	0	36
1998	2	2	5	1	57
1999	3	5	1	1	10
2000	4	9	1	0	51
2001	1	1	0	3	99
2002	4	1	2	3	28
2003	2	1	1	2	5
2004	4	1	0	2	59
2005	3	2	1	0	24
2006	1	4	1	2	2
2007	3	3	0	0	31
2008	3	2	0	0	36
2009	2	1	3	0	1
Total	163	157	42	32	726

Appendix C. Number of spotted owls detected on historic sites in the Oregon Coast Ranges Study Area, 1990–2009.

Year	Adult		Subadult		Unknown age			Juveniles
	Males	Females	Males	Females	Males	Females	Unknowns	
1990	54	40	9	4	34	28	9	42
1991	79	60	7	4	31	18	1	10
1992	92	88	6	6	20	17	7	70
1993	85	79	5	0	28	16	3	14
1994	100	101	13	8	23	12	2	71
1995	110	97	3	3	15	6	0	15
1996	109	94	9	11	12	9	1	107
1997	116	110	9	6	6	9	1	37
1998	116	107	16	10	12	10	0	68
1999	116	106	3	5	14	7	5	13
2000	118	101	5	4	11	7	2	51
2001	107	88	3	4	17	12	3	109
2002	94	78	7	10	27	14	3	31
2003	96	82	7	7	22	5	4	5
2004	91	84	1	4	16	11	3	65
2005	74	78	6	3	11	9	4	32
2006	70	64	2	3	17	10	5	2
2007	70	64	1	1	18	18	9	33
2008	62	52	1	2	14	13	1	36
2009	45	46	3	1	12	12	5	1

Appendix D. Proportion of female spotted owls that nested on the Oregon Coast Ranges Study, 1990–2009. Estimates were calculated for paired or single females whose nesting status was determined by 1 June. We estimated the 95% *CI* limits for values that met the sample size requirements for a normal approximation.

Year	Females			Nesting Adults		Nesting Subadults		Combined	
	Adults	Subadults	Unk	Prop.	95% *CI*.	Prop.	95% *CI*.	Prop.	95% *CI*
1990	19	2	7	0.90	————	1.00	————	0.86	————
1991	39	0	0	0.15	————	——	————	0.15	————
1992	66	6	4	0.71	0.60–0.82	0.50	————	0.68	0.57–0.79
1993	66	0	2	0.24	0.14–0.35	——	————	0.25	0.15–0.35
1994	85	5	2	0.67	0.57–0.77	0.40	————	0.64	0.54–.074
1995	85	3	0	0.17	0.10–0.26	0.00	————	0.16	0.08–0.24
1996	84	8	3	0.82	0.75–0.91	0.63	————	0.80	0.72–0.88
1997	100	6	0	0.42	0.32–0.52	0.00	————	0.40	0.31–0.49
1998	96	8	3	0.62	0.53–0.72	0.25	————	0.40	0.31–0.50
1999	91	2	1	0.18	0.10–0.25	0.00	————	0.17	0.09–0.25
2000	85	2	0	0.54	0.44–0.65	0.50	————	0.54	0.44–0.64
2001	75	2	2	0.87	0.79–0.94	0.00	————	0.85	0.77–0.93
2002	64	8	4	0.55	0.42–0.67	0.00	————	0.49	0.38–0.60
2003	64	5	0	0.06	————	0.00	————	0.06	————
2004	66	2	2	0.79	0.71–0.90	0.50	————	0.79	0.69–0.89
2005	73	2	1	0.47	0.35–0.58	0.00	————	0.45	0.34–0.56
2006	47	2	1	0.07	————	0.00	————	0.06	————
2007	48	1	0	0.63	0.49–0.76	0.00	————	0.61	0.47–0.75
2008	52	1	5	0.73	0.61–0.85	0.00	————	0.72	0.60–0.84
2009	46	2	0	0.02	————	0.00	————	0.02	————
Overall	1351	67	37	0.48	0.46–0.51	0.25	0.14–0.34	0.46	0.43–0.48

Appendix E. Proportion of female spotted owls that fledged young in 1990–2009 on the Oregon Coast Ranges Study. Estimates were calculated for paired or single females for which the number of young fledged was determined before 31 August. We estimated the 95% *CI* limits for values that met the sample size requirements for a normal approximation.

Year	Females			Female Adults		Females Subadults		Combined	
	Adults	Subadults	Unk	Prop.	95% *CI*	Prop.	95% *CI*	Prop.	95% *CI*.
1990	33	4	14	0.70	0.54–0.86	0.75	———	0.63	0.47–0.79
1991	53	1	2	0.11	0.03–0.19	0.00	———	0.13	0.04–0.22
1992	80	7	3	0.54	0.43–0.65	0.14	———	0.50	0.39–0.61
1993	70	0	3	0.11	0.04–0.18	——	———	0.12	0.04–0.20
1994	96	6	3	0.48	0.38–0.58	0.00	———	0.45	0.35–0.55
1995	92	3	1	0.10	0.04–0.16	0.00	———	0.09	0.03–0.15
1996	93	10	6	0.67	0.57–0.77	0.40	———	0.63	0.54–0.72
1997	109	6	1	0.24	0.16–0.32	0.00	———	0.23	0.15–0.31
1998	100	9	3	0.41	0.31–0.51	0.11	———	0.38	0.29–0.47
1999	100	3	2	0.08	0.03–0.13	0.00	———	0.09	0.03–0.15
2000	97	4	0	0.33	0.24–0.42	0.25	———	0.33	0.24–0.42
2001	87	4	4	0.68	0.58–0.78	0.00	———	0.65	0.55–0.75
2002	75	9	4	0.27	0.17–0.37	0.00	———	0.24	0.15–0.33
2003	80	8	1	0.05	0.00–0.10	0.00	———	0.05	———
2004	86	2	5	0.51	0.40–0.62	0.00	———	0.50	0.40–0.60
2005	77	2	2	0.33	0.22–044	0.00	———	0.31	0.21–0.41
2006	63	3	1	0.03	———	0.00	———	0.03	———
2007	64	1	0	0.38	0.26–0.50	0.00	———	0.37	0.25–0.49
2008	55	2	5	0.47	0.34–0.60	0.00	———	0.42	0.29–0.55
2009	46	2	0	0.02	———	0.00	———	0.02	———
Overall	1556	86	60	0.33	0.30–0.35	0.12	0.05–0.18	0.31	0.29–0.34

Appendix F. Proportion of nesting female spotted owls that produced young in 1990–2009 on the Oregon Coast Ranges Study. Estimates were calculated for paired or single females whose nesting status was determined by 1 June. We estimated the 95% *CI* limits for values that met the sample size requirements for a normal approximation.

	Females			Female Adults		Female Subadults		Combined	
Year	Adult	Subadult	Unk	Prop.	95% *CI*	Prop.	95% *CI*	Prop.	95% *CI*
1990	16	2	5	0.81	————	1.00	————	0.74	————
1991	6	0	0	0.67	————	——	————	0.67	————
1992	47	3	1	0.83	0.72–0.94	0.33	————	0.78	0.67–0.89
1993	15	0	1	0.53	0.28–0.78	0.00	————	0.50	0.25–0.75
1994	57	2	0	0.75	0.64–0.86	0.00	————	0.73	0.62–0.84
1995	14	0	0	0.64	————	——	————	0.64	0.39–0.89
1996	69	5	2	0.78	0.68–0.88	0.60	————	0.78	0.69–0.87
1997	42	0	0	0.62	0.47–0.77	——	————	0.62	0.47–0.77
1998	59	2	3	0.70	0.58–0.82	0.50	————	0.66	0.54–0.78
1999	16	0	0	0.50	0.26–0.75	——	————	0.50	0.26–0.75
2000	46	1	0	0.65	0.51–0.79	1.00	————	0.66	0.52–0.80
2001	65	0	2	0.83	0.74–0.92	——	————	0.82	0.73–0.91
2002	35	0	2	0.54	0.37–0.71	——	————	0.54	0.37–0.71
2003	4	0	0	1.00	————	——	————	1.00	————
2004	52	1	2	0.79	0.68–0.90	0.00	————	0.75	0.63–0.87
2005	32	0	0	0.75	0.60–0.90	——	————	0.75	0.60–0.90
2006	3	0	0	0.67	————	——	————	0.67	————
2007	29	0	0	0.76	0.60–0.92	——	————	0.76	0.60–0.92
2008	37	0	3	0.65	0.50–0.80	——	————	0.60	0.44–076
2009	46	2	0	0.50	————	0.00	————	0.50	————
Overall	690	18	21	0.68	0.64–0.71	0.50	0.21–0.67	0.70	0.66–0.73

Appendix G. Estimated mean fecundity ($\hat{b}$) of female spotted owls in 1990–2009 on the Oregon Coast Ranges Study. Fecundity was defined as the number of female young produced per female, assuming a 1:1 sex ratio of offspring. Estimates were calculated for any female for which the number of young fledged was determined before 31 August.

	Female			Adults		Subadults		Combined	
Year	Adults	Subadults	Unk	$\hat{b}_A$	*SE*	$\hat{b}_S$	*SE*	$\hat{b}$	*SE*
1990	33	4	14	0.47	0.07	0.38	0.13	0.41	0.05
1991	53	1	1	0.06	0.05	0.00	0.00	0.09	0.03
1992	80	7	3	0.42	0.06	0.14	0.14	0.38	0.05
1993	70	0	3	0.09	0.03	——	——	0.10	0.03
1994	96	6	3	0.37	0.04	0.00	0.00	0.34	0.04
1995	92	3	1	0.08	0.03	0.00	0.00	0.08	0.03
1996	93	10	6	0.52	0.04	0.35	0.15	0.50	0.04
1997	109	6	1	0.17	0.03	0.00	0.00	0.16	0.03
1998	100	9	3	0.32	0.04	0.11	0.11	0.30	0.04
1999	100	3	2	0.06	0.02	0.00	0.00	0.06	0.02
2000	97	4	0	0.26	0.04	0.13	0.13	0.25	0.04
2001	87	4	4	0.59	0.05	0.00	0.00	0.57	0.05
2002	75	9	5	0.19	0.04	0.00	0.00	0.17	0.04
2003	80	8	1	0.03	0.02	0.00	0.00	0.03	0.02
2004	86	2	5	0.40	0.05	0.00	0.00	0.39	0.05
2005	77	2	2	0.23	0.04	0.00	0.00	0.22	0.04
2006	63	3	1	0.03	0.02	0.00	0.00	0.03	0.02
2007	64	1	0	0.28	0.05	——	——	0.28	0.05
2008	55	2	5	0.36	0.06	0.00	0.00	0.32	.06
2009	46	2	0	0.01	0.01	——	——	0.01	0.01
Overall	1556	86	60	0.25	0.01	0.09	0.03	0.24	0.01

Appendix H. Mean brood size of female spotted owls in 1990–2009 on the Oregon Coast Ranges Study. Mean brood size was defined as the number of young produced per female that fledged at least one young before 31 August.

	Females			Adults		Subadults		Combined	
Year	Adults	Subadults	Unknowns	$\overline{x}$	*SE*	$\overline{x}$	*SE*	$\overline{x}$	*SE*
1990	23	3	6	1.34	0.10	1.00	0.00	1.31	0.08
1991	6	0	1	1.50	0.22	——	——	1.43	0.20
1992	43	1	1	1.56	0.08	2.00	0.00	1.57	0.08
1993	8	0	1	1.50	0.19	——	——	1.56	0.18
1994	46	0	1	1.52	0.07	——	——	1.51	0.07
1995	9	0	0	1.67	0.17	——	——	1.67	0.17
1996	62	4	3	1.57	0.06	1.75	0.25	1.58	0.06
1997	26	0	1	1.39	0.10	——	——	1.37	0.54
1998	41	1	1	1.56	0.09	2.00	0.00	1.57	0.08
1999	8	0	1	1.50	0.19	——	——	1.44	0.18
2000	32	1	0	1.56	0.09	1.00	0.00	1.55	0.09
2001	59	0	3	1.75	0.06	——	——	1.76	0.06
2002	20	0	1	1.45	0.11	——	——	1.43	0.11
2003	4	0	0	1.25	0.25	——	——	1.25	0.25
2004	44	0	2	1.57	0.08	——	——	1.57	0.07
2005	25	0	0	1.44	0.10	——	——	1.44	0.21
2006	2	0	0	2.00	0.00	——	——	2.00	0.00
2007	24	0	0	1.50	0.10	——	——	1.50	0.10
2008	26	0	0	1.62	0.11	——	——	1.62	0.11
2009	1	0	0	1.00	1.00	——	——	1.00	1.00
Overall	509	10	22	1.55	0.02	1.50	0.17	1.54	0.02